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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/015,106	12/11/2001	Laurence W. Davies	26998-241146	6824

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FAEGRE & BENSON LLP
2200 WELLS FARGO CENTER
90 SOUTH 7TH STREET
MINNEAPOLIS, MN 55402

EXAMINER	
TORRES VELAZQUEZ, NORCA LIZ	
ART UNIT	**PAPER NUMBER**
1771	

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary	Application No.	Applicant(s)	
	10/015,106	DAVIES ET AL.	
	Examiner	Art Unit	
	Norca L. Torres-Velazquez	1771	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-76* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-76* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

1. The rejection of claim 55 under 35 U.S.C. 112(2) has been withdrawn in view of amendment.

2. Applicant's arguments with respect to claims 1-76 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-9, 13-15, 26-27, 30-31, 37, 54, 59-62, 64-65, 67-68, 72 and 74 are rejected under 35 U.S.C. 103(a) as being unpatentable over HARAGUCHI et al. (US 5,286,553) in view of BEALL (US 4,983,453).

HARAGUCHI et al. discloses a composite sheet for a reinforcing material that has excellent moldability and processability. (Column 1, lines 12-18) The reference teaches the use of a bundle of reinforcing filaments that are gathered and unidirectional paralleled in each of the web-constituting reinforcing filament bundles and the filaments are not entangled with one another. A web having bundles of reinforcing filaments gathered and unidirectionally paralleled are preferably used, because the strength and rigidity can be effectively *imparted in the necessary direction in the molded article* (Column 4, lines 23-37). Therefore, the use of reinforcing filaments extending in a particular direction (such as a transverse direction) is dependent upon the strength and rigidity needs of the molded article. Reinforcing filaments are

substantially continuous fibers, for example, a carbon fiber, a glass fiber, an aramid fiber, a silicon carbide fiber, a polybenzothiazole fiber. The reference also teaches that even a thermoplastic polymer filament can be used as the reinforcing filament if the fiber is not substantially melted at the step of heat-melting the thermoplastic polymer fiber and exerts a reinforcing function after cooling and solidification. With regards to the claimed treatment on claim 32, the reference also teaches that to facilitate the impregnation with a melt of the thermoplastic polymer fiber at the heat-melting step for forming a composite, preferably the surfaces of single filaments of the reinforcing filament bundle are coated with a thermoplastic polymer so that the softness is not lost. (Column 4, lines 57-60 and Column 5, lines 3-22). The amount of the reinforcing filament bundle in the composite sheet is 5 to 80% by volume based on the composite sheet. Among the thermoplastic polymer fiber material used is polyester. (Column 5, lines 44-65) The thermoplastic polymer may be in the form of an alloy, and two or more thermoplastic polymer fiber can be used. (Column 6, lines 1-3) The reference teaches the use of thermoplastic polymer staple fibers having a length no longer than 100 cm [39 inches], preferably no longer than 10 cm [3.9 inches]. (Column 7, lines 7-9) With regards to claims 6 and 7, the reference teaches the use of a staple fiber sheet having a basis weight of 64 g/m^2.

HARAGUCHI et al. further teaches the use of a process in which a thermoplastic polymer staple fiber or filament is deposited or incorporated in the form of single filaments on or in a web containing a reinforcing filament bundle, and a jet of fluid is applied to the assembly to intrude the thermoplastic polymer fiber into the reinforcing filament bundle and entangle and integrate the thermoplastic polymer fiber with the filaments. (Column 8, lines 23-32)

In a preferred embodiment of the HARAGUCHI et al.'s invention, reinforcing filament bundles are unidirectionally paralleled to form a web, and this web is laminated on the thermoplastic staple fiber web. Then the laminate of the thermoplastic staple fiber or filament sheet and the reinforcing filament bundle is subjected to a mechanical process by a jet stream of a fluid. More specifically, at least two sheets of the thermoplastic fibers and at least two webs of the reinforcing filament bundles are laminated (laminated is sometimes carried out by changing the arranging direction of the reinforcing fiber or using different kinds of reinforcing fibers), and the jet stream of a fluid is made to pierce through the laminate in the direction orthogonal to the plane of the sheet, whereby the thermoplastic fiber is embedded in the reinforcing filament bundle web and is entangled and integrated with individual filaments of the reinforcing filament bundle to obtain the intended composite sheet. (Column 8, lines 36-68)

While HARAGUCHI et al. teaches a reinforcing material, it fails to teach a pultruded part that also comprises a plurality of longitudinal rovings oriented along the longitudinal axis and a resin matrix surrounding the longitudinal rovings and the reinforcing structure.

BEALL teaches a composite pultruded product that is made with a plurality of longitudinally oriented, essentially parallel glass roving strands in association with a cellulosic mat [which constitutes a reinforcing structure]. The reference further teaches that both the roving strands and the cellulosic mat are completely encased within a resin matrix. (Column 3, lines 26-33)

Since both, HARAGUCHI et al. and BEALL are directed to reinforcement materials, the purpose disclosed by BEALL would have been recognized in the pertinent art of HARAGUCHI et al. It is the Examiner's position that both references teach a same type of reinforcing article

and it is noted that pultrusion is known in the art as a molding technique, the prior art also refers to pultrusion as an essentially continuous molding process, as it is evidenced by prior art such as HOTA et al. (US 6,591,567 B2) and MARSHALL et al. (US 6,011,087). Therefore, the Examiner states that the references are analogous art and the Haraguchi reference is not limiting the molding to a static process, or at least is not precluding pultrusion as a type of molding.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the reinforcing material and provide it with longitudinal rovings and encase both the reinforcement and the rovings within a resin matrix with the motivation of producing a pultruding product as disclosed by BEALL. (Abstract). It is noted that the Examiner has relied on the BEALL reference to show that the use of longitudinal rovings and a resin matrix in combination with a reinforcement material is well known in the art.

5. Claims 11-12 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over HARAGUCHI et al. and BEALL as applied to claims 1-9, 13-15, 26-27, 30-31, 37, 54, 59-62, 64-65, 67-68, 72 and 74 above, and further in view of MARTIN et al. (US 6,080,482).

While HARAGUCHI et al. teaches that the thermoplastic polymer of the polymeric fibers may be in the form of an alloy, and two or more thermoplastic polymer fiber can be used. (Column 6, lines 1-3), it fails to teach the use of bi-component fibers with core-sheath configuration.

MARTIN et al. teaches multicomponent filaments that may be fabricated into filamentary articles or structures or three-dimensional aggregations comprising a plurality of the filaments, which can be in either continuous or staple form. Further, the reference teaches the use of these

filaments as reinforcement for plastic matrices. (Column 6, lines 25-67 through Column 7, lines 1-4). In Figures 7-14, the reference shows different configurations of core-sheath fibers

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the polymeric staple fiber layer and provide with a bicomponent fiber with the motivation of providing the reinforcement material with a web layer that is durable without requiring the application of binding agent, or adhesive coating, or solvent and that can be used for article fabrication once the webs are melt-bonded as disclosed by MARTIN et al. (Column 6, lines 14-18).

6. Claims 18-19 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over HARAGUCHI et al. and BEALL as applied to claims 1-9, 13-15, 26-27, 30-31, 37, 54, 59-62, 64-65, 67-68, 72 and 74 above, and further in view of SHANNON (US 4,278,720).

HARAGUCHI et al. fails to teach the use of a binder to attach the permeable transport web to the first reinforcing fibers.

SHANNON discloses a bonded mat that includes directionally oriented strands held together by swirled strands or randomly oriented fibers, and all of which are permanently held together by a binder. (Abstract and refer to Example 1)

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the reinforcement material and provide with a binder with the motivation bonding the strands with an organic binder which softens or sometimes dissolves to some degree in later applied organic impregnating resin; so that the strands become unbonded to allow the mat to stretch over projections during the molding as disclosed by SHANNON. (Column 1, lines 10-17). With regards to claim 19, it is noted that the use of

binders, such as polyvinyl acetate, are know to be used in the art of reinforcement material. For example, the prior art RADVAN et al. (US 4,882,114), teaches a fiber reinforced material and teaches the use of polyvinyl acetate as a binder. (Refer to claims)

7. Claims 16-17, 34-36, 38-49, 57-58, 69-71 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over HARAGUCHI et al. and BEALL as applied to claims 1-9, 13-15, 26-27, 30-31, 37, 54, 59-62, 64-65, 67-68, 72 and 74 above, and further in view of VANE (US 5,055,242).

HARAGUCHI et al. fails to teach the use of stitching.

VANE discloses a reinforcing material having a plurality of superimposed layers, each layer consisting of a plurality of unidirectional non-woven yarns or threads laid side-by-side, the yarns or threads in at least some of the different layers extending in different directions, the layers are stitched together. (Column 2, lines 14-21). The reference further discloses that the yarns or threads in at least two of the layers are laid so that they extend at 90° to one another. The yarns or threads in at least one further layer are laid so that they extend at an angle of from 45° to 90° with respect to the yarns or threads in at least one the two layers. (Column 2, lines 26-42). The yarns or threads used to produce the reinforcing material may be yarns, threads, roving, tows or the like, of continuous or discontinuous fibers, of glass fiber or other suitable reinforcing material. The yarn of thread used for stitching together the layers may itself be a reinforcing material or a thermoplastic or other material. (Column 2, line 58 through Column 3, lines 1-2) Further, the reference teaches the use of at least one sheet of thermoplastic material interposed between at least two of the reinforcing material layers. (Column 3, lines 20-21)

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the reinforcing material and provide it with a stitching to hold the fibers with the motivation of overcoming some of the disadvantages of the prior art, such as by mixing the reinforcing fibers with synthetic material that produces resin-rich and reinforcing fiber-rich areas whereby the quality and mechanical properties of the article can be unpredictable as disclosed by BEER. (Column 1, lines 10-68).

8. Claims 20-25, 32-33 and 75-76 are rejected under 35 U.S.C. 103(a) as being unpatentable over HARAGUCHI et al. and BEALL as applied to claims 1-9, 13-15, 26-27, 30-31, 37, 54, 59-62, 64-65, 67-68, 72 and 74 above, and further in view of BEER et al. (US 5,910,458).

HARAGUCHI et al. fails to teach perforations or holes in the reinforcing structure, it also fails to teach the use of a surface treatment on the fibers.

BEER et al. discloses a mat adapted to reinforce a thermosetting matrix material, the mat comprises a primary layer comprising a plurality of generally parallel, essentially continuous glass fiber strands oriented generally parallel to a longitudinal axis of the mat; and a secondary layer positioned adjacent to a surface of the primary layer that comprises a plurality of randomly oriented, generally continuous glass fiber strands. The reference further teaches that the strands of the primary layer are entangled with the strands of the secondary layer by needling together at least a portion of the strands of the primary layer and the strands secondary layer to form a mat. (Column 2, lines 16-45) The reference further teaches that the secondary layer comprises a plurality of randomly oriented glass fiber strands, which comprised generally continuous glass fiber strands and/or discontinuous or chopped glass fiber strands. (Column 14, lines 7-10)

BEER et al. uses needling to entangle the layers of their mat. Since the claimed permeability is produced by treating the mat by hydro-entanglement or by needling, this property would have been an expected result of the needling process taught by BEER et al.

Further, on Table I of BEER et al. a sizing composition is disclosed for the mat fiber that includes gamma-aminopropyltriethoxysilane.

Since the references are directed to reinforcement materials, the purpose disclosed by BEER et al. would have been recognized in the pertinent art of HARAGUCHI et al. and BEALL.

Therefore, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the reinforcement material and provide with a coating or sizing treatment with the motivation of providing it with a good "wet-through" and "wet-out" properties as disclosed by BEER et al. (Column 1, lines 29-39).

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Norca L. Torres-Velazquez whose telephone number is 571-272-1484. The examiner can normally be reached on Monday-Thursday 8:00-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Norca L. Torres-Velazquez
Examiner
Art Unit 1771

March 22, 2004

ELIZABETH M. COLE
PRIMARY EXAMINER